FILED

DEC 89

ZX-Appeal

vancouver sinclair users group

next meeting:

KILLARNY COMMUNITY CENTRE
6260 KILLARNY STREET
VANCOUVER

FRIDAY; 7:00PM

December 8/89

ZXAppeal is a monthly newsletter put out by the Vancouver Sinclair Users Group. For more information on the group and ZXAppeal see the backcover.

inside

THIS ISSUE.....

Editor: "Hi Gang!"
Gang: "Hi Mr. Editor!"
Editor: "Well Gang, we've got a real swell issue for you this month: Mr. Ken has given us his member's profile; Mr. Vince is back with another installment of his MC Series; and Mr. Scribe helps us catch up on what has been happening at the meetings. We have a visitor this month, gang:- Mr. Bill from Ottawa dropped in with a real neat program printout. We are also reprinting a whole bunch of stuff stolen from various periodicals. OK gang, here we go.....
Gang: Yaaahhhh.

****

Renewing Members:

Glenn Read, Gale Winterburn, Wilf Rigter
Bill May Jr., Don Lambert, Rene Bruneau
Warren Tucker, Tim Stoddard, Vince Lee

****

....meeting date!!

DECEMBER

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October 13/89 Minutes
by your HUMBLE scribe

Well, it was just another one of those triskaidekaphobic nights, boys and girls. Jim H. was all dressed up in his Friday the13th Part LM sweatshirt and to make it really chilling, we had elections. I arrived late 'cause I was in the middle of things and didn't realize it was the meeting night until my ride arrived. I was sort of in a daze - one step behind all night. So when I arrived the terrific food brought in by Rusty especially for "Election Nite" was almost all gone but spirits were high. It felt good - a party atmosphere.

Gerd rapped the gavel at 19:55. There were 20 brave souls present. Right off Gerd wanted to show us the analog joystick interface for the ZX81 built by Fred Nachbaur and sent to us to try out.

Glenn R., the VP, reported there are not many of the RGB monitors left. He's been busy with work and other concerns lately and has not had much time to spare. Glenn then regaled us with stories of minicomputer (CDC) disk drive misadventures. He had a damaged 14" disk pack which we disassembled and passed around. Several of the disks showed extensive head crash damage.

Rod H., the Treasurer, reported the treasury remains stable at about CAN$1200.00 in ye olde credite union, before deducting newsletter and food costs.

Rod H., the Editor, said "Send articles"! Rod further advised that he would be stepping down as N/L Editor if club members did not do more to support the newsletter. Something about a silk purse/sow's ear?

Harry S. reported he is still building his house and so not much had been happening with the hardware group. There was something here about a 4 hour phone call from a VSUGer in Texas named Sean. Harry stood to praise Vince Lee's excellent ML article in the last newsletter issue. [And so say we all.]

Marcio V. mentioned a project to control the temperature of a soldering iron tip. Look for an article on that. There was also a NiCad timer project coming from Marcio.

Wilf R. has been playing with dual TS1E3's

(Harvey told me this is tech-talk for TS1000...Ed) - one in 'fast' to compute and one in 'slow' to display.

Rusty T., the inveterate bargain hunter and aficianado of auctions brought along a MemoTech 512 FDX computer he'd picked up for $40.00. The new price in Britain for the computer was £295 and the CPM dual drive consule put it up another £1000.

Jim H. had an interesting project to display, a bus buffer for the TS1000. I believe he said it was easily modifiable to the 2068 as well. No more worrying about how much of a load you have hanging off the bus. Many people will find this invaluable.

Wilf R. brought in an industrial controller board which got passed around.

Neither the 1000 or 2068 librarians had news but Rod H. severely shook the pot when he suggested the club buy a Larken disk drive system for the 2068 library. There was a long seesaw discussion of this matter, during which it came out that Bill R. has bought an MSDOS system and will be resigning as the 2068 librarian and leaving us in the new year. Harry Slot volunteered to assume some librarian duties, sort of. When we get the disk system and see what the demand is like, decisions will be made.

At some point in here Ken G. demoed the Currah Speech/MicroSpeech system. Then Rod H. played with a laser he'd brought along. There was some discussion of the Pacific Coast Computer Fair Association annual fair and who would be manning the club table. (The fair was held this past Oct 21/89 and went off quite well. There was a club table around which Rod, Gerd, Wilf, Harvey, and Louis (at least) were to be seen.)

Elections were the least painful in years. Glenn Read resigned as Vice Pres due to the lack of time, but otherwise the old slate remained the same with the re-appearance of Rusty as VP:

Pres. - Gerd Breunung
Vice - Rusty Townsend
Treas- Rod Humphreys
Scribe-Harvey Taylor

The appointed positions also remained the same:

N/L Editor-Rod Humphreys
TS1000 Librarian-Gerd Breunung
TS2068 Librarian-Bill Rutter
(until Jan)

A motion was made and passed that funds be appropriated for coffee each meeting. Rusty volunteered to look after this each meeting.

The evening degenerated into separate conversations. A splendid time was had by all.

Nov 10/89 Minutes

-by your humble scribe

It was a funny meeting. Gerd was late and the rest of us sat around and held a stimulating and multi-faceted discussion, i.e. shot the shit, until he did show up.

Gerd kicked things off by passing around a silicon wafer. This is the slice of silicon monocrystal which is etched and made into chips. Gerd showed us a poster of the Intel 80386 MPU, blown up to about 2 by 3 feet. Gerd also had the pocket modem which he mentioned last month. This is a sleek red 1200 baud job that plugs directly onto the serial port DB-25.

Rusty Townsend had brought in some 3M Telex machines which of course he picked up at a rummage sale for peanuts. These things are built like a tank. The printer works 'cause we got the self-test and echo modes running at the meeting. They were donated to the hardware SIG to mess around with.

Wilf Rigter had a printer interface he built using the Z80-PIO. (I have to apologize to Wilf; I have a note that says "mystical exploded mice", but I don't remember what it means.)

There was some talk of the Plaza of Nations swap meet. Apparently about 250 people paid $4.75 to get into a meet mainly of dealers.

Somebody mentioned Hagen's re-mailing services in the USA and this started a rambling discussion of that great Canadian pastime - crossing the border to go shopping on a Sunday afternoon. Ken Abramson told us about the difficulty of getting moon rocks across the

border. After declaring them as moon rocks one year, suffering through miles of red tape and never actually getting them across the border, the next year the moon rocks were declared simply as a rock collection!

A big sale at Puyallup in WA and the general condition of the Boeing Store occasioned another discussion. At 20:35 Ken asked Gerd, "Are you going to call the meeting to order?" Bob Denison chose this opportune moment to go back to work: he was on a coffee break.

Rod Humpreys was in Mexico so there was no Editor's report. He sent word via Gerd that we have about CAN $1200 in ye olde credite union. Glenn Read is once again battling the Squamish highway rains and was unable to make it.

Mario Vieira stood to tell us of problems he is having with the Tasman and Larken interfaces. Apparently they do not work together. The HW SIG is taking a look at the problem. Otherwise Harry Slot of the HW SIG reports that his house is almost complete.

The TS1000 and 2068 librarians had nothing to report. There was talk of the Pacific Rim C&C show and the laptops shown there. At 21:05 Louis Montminy walked in. He had just bought a KayPro 4 and was all enthusiastic and full of questions.

Gerd stood to tell us about a CDC hard drive he had accumulated from work. The evening dribbled away in pleasant talk of earthquakes and computer shows. Eventually some recreation centre staff suggested that they would really like to get home tonight and could we wrap it up?

MEMBER'S PROFILE : KEN ABRAMSON

It all began with my attending a B.C. Teachers' Federation conference on computer technology in 1980. I had previously been attempting to learn about microcomputers by taking courses sponsored by the school board. As a teacher, I could see the potential of these machines, but I was left with a feeling of extreme skepticism. Firstly, the software was pretty useless, unless one had access to something called an APPLE, and secondly, the cost of a single APPLE (to say nothing of a classroomful) was astronomical. It was with this background of skepticism that I reluctantly attended that 1980 computer conference.

I quickly made my rounds of all the booths, impressed only by one or two pieces of educational software with flashy color graphics and sound, and was about to exit the display area when a strange little white device with an even stranger looking keyboard caught my eye. It was called a SINCLAIR ZX80. It was being displayed by the Open Learning Institute, and was being used to teach correspondence courses in computing science to students in rural areas. Here was a computer so small it could be sent through the mail at a very low cost! Not only was the miniaturization impressive, but also the I/O system: a cheap B&W TV, and an ordinary audio cassette tape recorder. But the most impressive thing of all was the price -- a mere $200!! At that price, it might be possible to have a computer in every classroom! By the time I had gone through the rigamarole of going to my principal on bended knee for some funding to purchase a ZX80, along came the new and improved ZX81. This was too good to be true! I could get a kit to build a ZX81 for only $179 from a Canadian electronics dealer in Toronto called GLADSTONE.

After two long evenings of breathing resin vapors eminating from a little pc board on the kitchen table, I hooked it up to my TV and the damn thing worked! It was sort of weird pressing a key and getting a whole command spelled out on the screen, but boy, did it ever speed up programming for kids!

Someone at a school board computer meeting told me about a Sinclair Computer Club meeting at Vancouver Vocational Institute, so off I trundled to VVI. There was this great master of ceremonies named Karl Brown who seemed to run things, and quite a few others who seemed to know something about computers, ...

and then there was I, who knew that I knew zilch. The neat thing was, however, that there were several members of the group who appeared to be as ignorant of the workings of computers as I! The other neat thing was that Karl and the others continually explained things and answered questions in a way that eventually helped the concepts to begin to sink in. Even with a science background and a lot more computer experience, I still marvel at the fantastic design and capabilities of the lowly ZX81!

I am presently translating one of my old ZX81 GRADEBOOK programs into APPLESOFT BASIC. Yes, it's nice to have READ/DATA statements, but it's much nicer to use SINCLAIR BASIC. E.g.-- after some agonizing over why my Class Average and my Class Percent results were all screwed up, I finally discovered that the computer only looks at the first two letters of APPLESOFT variables. The variables that I happened to be using on the ZX81 were CLAV and CLPC. That little 8K Sinclair ROM has the APPLE 32K ROM beat all to hell as far as friendliness & sophistication!

To make a long story short, the little black box made a real impact on my entry into the understanding and the use of microcomputers. I was able to talk the principal into buying enough ZX81s to place one in every classroom in the school and was cursed by school board officials who would not admit that ZX81s were true computers that were much more user friendly to kids than the 'real' computers. I also have letters stating that they would not stand up under student use (I'm still using them). I credit the ZX with saving our school thousands of dollars that other schools poured down the drain on PET hardware and software that really didn't accomplish any more than our little ZXs.

I have since attended club meetings of 'real' computer users, and have yet to find the kind of participation, availability of help, and the educational quality that has always been a part of the Sinclair Club membership. The length of time this group has held together after the extinction of its reason for being, is truly a phenomenon that is a unique achievement.

TRIVIA CORNER

1) In round numbers, how long would it take to transmit the entire Enclopedia Brittanica over a 2Gb fibre optic line ?

2) Where does the term "BUG" come from in computer programming ?

3) Who are the three largest computer companies in Canada ?

4) What is the length of one bit of data travelling at 56Kbps ?

5) What is the definition of team effort ?

6) What is the approximate resale value of an IBM 1401 or DEC PDP-8 ?

Anwers to Trivia Corner

1) One second

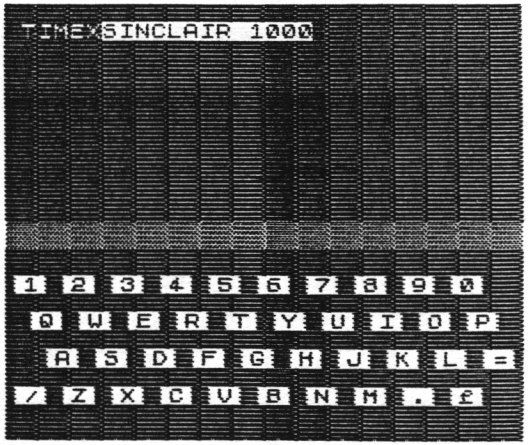
2) Grace Hopper encounters the first "computer bug: during work on the Mark II, when a circuit malfunction is caused by a two-inch long moth stuck in a relay

3) IBM, Digital Equipment Corp., and ComputerLand

4) Approximately 3.3 miles

5) A project that no one person understands well enough to claim credit for

6) 10-50¢ per pound for scrap. These systems may end up in the steering wheel of your new Chevy , or as the essence of your next denial inlay



Applying the ZX Assembler

By V. Lee

Last month we looked at printing to the screen using the help of the ROM's RST 10 routine. This month we'll try it without using the ROM. The advantage is an increase in speed but on the down side is the lost of the error checking routines.

In a 16K ZX/TS, an area in memory is set aside to hold the picture information for the ULA chip to produce the display on the screen. This area is known as the "dilay file". Place a character's hex code into a specific location in this file and the character will appear in its corresponding place on the screen. However there are three important things to remember; This file dose not have a fixed location, information is stored in a particular format and expanded characters placed in the file will corrupt the display.

There is another area of memory reserved by the computer which contains information used by the system. Hense it is called the "System Variables". At location 16396, 16397 named "D_FILE", the starting location of the display file is stored. (You should also note that location 16400, 16401 named "VARS" contains the starting location of the stored variables. Since variables are placed right after the display file in memory, this address can also be thought of as the first memory location after the dilay file.)

The display file uses hex code 76 (or if you prefer, the instruction HALT) as markers. This is automaically set up by the computer. The very first byte in the file contains a marker. It is then followed by twenty-four sets of 33 memory locations. The twenty-four sets represents the rows on the screen. The first 32 locations in each set represents the columns in the row while the 33rd location contains a line end marker.

Let's take a look at the machine code program which draws a picture of a TS1000. It was originally written in BASIC by Wayne McCarthy and it has appeared in one of the early newsletters. We begin by setting up the variables to make the listing easier to follow. The HL register will be used as the screen pointer. We start by locating the address of the "screen" in memory. Notice how we skip the first address with the INCrement instruction because it contains a marker. We then CALL on our subroutines to do their chores and then we return back to BASIC.

Just like last time we are using a system known as parameter passing. In this case, the subroutines are used to to set up the environment to CALL on one of the three printing routines, PRROW, PPOKE or MPOKE. The PUSH HL instruction saves a copy of the "screen address" to the STACK. This allows us to manipulate the pointer to print to different lines on the screen. And when we are finish, the POP HL instructions returns the HL pointer back to its original position.

PRROW is used to print lines of a single character to the screen. It is used to draw the case and the line across it. The start of the row is located. The B register is set up to loops thirty-two times to fill up the line while the C register is set up to loop for the number of lines to be filled. At the end of each line, the address is INCremented to avoid overwriting the marker. This routine can also be used to clear the screen by loading the "space" character in register A.

PPOKE is used to print text to the screen. Two pointers are used. One which keeps track of the "screen" while the other keeps track of the letters printed. It is possible to print more than one line at a time by over printing the line end marker with another marker. However if you "erase" a marker, the display will be corrupted. Mutiples of twirty-thee, locates the start of each line while an offset less than thirty-one, allows for a "TAB" function. MPPKE is just a modified version of the PPOKE routine. This new routine allowed the two graphic characters to sanwiched the letters on the keys.

One of the most neglected aspects of programming is proper documentation. It does mean more work but it is important that the codes be understood for future references. The header which are the instructions at the beginning of the routine explains what the routine is and how to use it. The explainations in the comments column explains the purpose of the code. Notice in the PRROW routine, the first four lines of code was summed up with the comment "fill row with character stored in A". We didn't explain how the B register is set up to loop thirty-two times. Nor the fact that the HL register pair is being INCremented. This can be seen just by looking at the code. But what can't easily be seen is why are we doing this?

Just how slow is BASIC? Run this program and a picture of the TS1000 will instantaneouly appear while the BASIC part will crawl along at a snail's pace as it tries to number the lines on the screen. At the end of the program press the C key if you want a copy of the screen printed out onto the TS2040 printer.

```
        ;------------------------;
        ;        TS1000          ;
        ;------------------------;
        ;                        ;
        ; THIS PROGRAM GIVES AN  ;
        ;EXAMPLE OF THE VARIOUS  ;
        ;METHODS OF PRINTING TO  ;
        ;THE SCREEN WITHOUT      ;
        ;USING THE ROM ROUTINES. ;
        ;------------------------;

ENDM= FF       ;MSSGE END MARKER.
INVSP=+128     ;CHARACTER CODE.
CHKER=+136     ;CHARACTER CODE.
CKINV=+138     ;CHARACTER CODE.
COLSP=+5       ;CHARACTER CODE.
SPCOL=+133     ;CHARACTER CODE.
LOOP4=+4       ;LOOP TO PRT KEYS.
DFILE=+16396   ;LOCATE D. FILE.
COLMN=+32      ;32 COL PER ROW.
LIN1= +1       ;PRINT 1 LINE.
LIN24=+24      ;PRINT 24 LINES.
NXLIN=+34      ;SKIP TO NEXT LIN.
ATR1= +33      ;AT ROW 1,  33*1.
ATR12=+396     ;AT ROW 12, 33*12.
ATR15=+495     ;AT ROW 13, 33*15.
COPY2=+02155 ;COPY2 ROUTNE ADR.

        ;------------------------;


START LD HL,(DFILE);FIND START
      INC HL       ; OF SCREEN.
      CALL CASE    ;PRNT CASE.
      CALL STEP    ;PRNT STEP.
      CALL NAME    ;PRNT NAME.
      CALL KEYS    ;PRNT KEYS.
      RET

CASE  PUSH HL      ;SAVE SCN LOC.
      LD C,LIN24   ;PRINT
      LD A,INVSP   ; 24 LINES OF
      CALL PRROW   ; INVSPACE.
      POP HL       ;RSTORE S LOC.
      RET

STEP  PUSH HL      ;SAVE SCN LOC.
      LD DE,ATR12;BEGIN PRINTNG
      ADD HL,DE    ; AT LINE 12,
      LD C,LIN1    ;ONE
      LD A,CHKER   ; LINE OF
      CALL PRROW   ; CHECKERS.
      LD C,LIN1    ;THEN
      LD A,CKINV   ; ONE LINE OF
      CALL PRROW   ; CK/INV.
      POP HL       ;RSTORE S LOC.
      RET

        ;------------------------;
        ;        PRROW           ;
        ;------------------------;
        ; THIS ROUTINE WILL      ;
        ;PRINT ROWS OF UNEXPAND. ;
        ;CHAR. TO THE SCREEN.    ;
        ;                       ;
        ;HL POINTS TO BEGINNING ;
        ;   OF THE ROW IN DISPL.;
        ;   CONTENTS IS ALTERED.;
        ;C  CONTAINS THE NUMBER ;
        ;   OF ROWS TO BE PRTED.;
        ;   CONTENTS IS ALTERED.;
        ;A  CONTAINS THE HEX    ;
        ;   CODE OF THE CHARCTER;
        ;   TO BE PRINTED.      ;
        ;                       ;
        ;B  CONTENTS IS ALTERED.;
        ;CAUTION- NO ERROR TRAP ;
        ;   IN ROUTINE.         ;
        ;------------------------;

PRROW LD B,COLMN ;FILL
CLOOP LD (HL),A  ; ROW WITH
      INC HL     ; CHARACTER
      DJNZ CLOOP ; STORED IN A.
      INC HL     ;SKIP "ENTER",
      DEC C      ;CONT TILL ALL
      JR NZ PRROW; ROWS CPLETE.
      RET

        ;------------------------;


NAME  PUSH HL     ;SAVE S LOC.
      LD DE,ATR1 ;MOVE PRINT
      ADD HL,DE  ; POS TO ROW1.
      LD DE,NMCHR;PRINT
      CALL PPOKE ; NMCHR.
      POP HL     ;RSTORE S LOC.
      RET

NMCHR 80 B9 AE B2 AA BD
      "SINCLAIR 1000" FF

KEYS  PUSH HL     ;SAVE S LOC.
      LD B,LOOP4 ;ADJ 4 LOOPS.
      LD DE,ATR15;MOVE S POINTR
      ADD HL,DE  ; TO ROW 15,
      LD DE,K1CHR;MOVE CHR PTR.
KLOOP CALL PPOKE ;PRINT
      INC DE     ; TAB CHRS.
      CALL MPPKE ;PRINT
      INC DE     ; CHARACTERS.
      CALL PPOKE ;PRINT ROW
      INC DE     ; FILL CHRS.
      PUSH DE    ;SAVE CHR PTR.
      LD DE,NXLIN;SKIP A
      ADD HL,DE  ; SCREEN LINE.
      POP DE     ;RSTORE CH PR.
      DJNZ KLOOP ;CONT. TILL
                 ; K4CHR FNISH.
      POP HL     ;RSTORE S LOC.
      RET

K1CHR FF
      "1234567890" FF
      80 80 FF

K2CHR 80 FF
      "QWERTYUIOP" FF
      80 FF

K3CHR 80 80 FF
      "ASDFGHJKL=" FF
      FF

K4CHR FF
      "/ZXCVBNM.£" FF
      80 FF

        ;------------------------;
        ;        PPOKE           ;
        ;------------------------;
        ; THIS ROUTINE WILL      ;
        ;PRINT UNEXPAND CHARS    ;
        ;TO THE SCREEN.          ;
        ;                       ;
        ;HL    POINT SCREEN LOC.;
        ;      CNTNTS IS ALTERED;
        ;DE    POINT FIRST CHAR.;
        ;      TO BE PRINTED.   ;
        ;      CNTNTS IS ALTERED.;
        ;"FF" END OF CHR MARKER.;
        ;                       ;
        ;A     REG IS ALTERED.  ;
        ;CAUTION, NO ERROR TRAP.;
        ;------------------------;
```

```
PPOKE LD A,(DE)  ;GET CHAR.
      CP ENDM    ;QUIT IF IT
      RET Z      ; IS THE ENDM.
      LD (HL),A  ;PRINT
      INC HL     ; CHARACTER.
      INC DE     ;UPDT CHR. PTR.
      JR PPOKE   ;GO GET NX CHR.

      ;------------------------;
      ;         MPPKE          ;
      ;------------------------;
      ; THIS IS A MODIFIED VER;
      ;OF PPOKE. THIS VERSION  ;
      ;WILL PRINT IN THE       ;
      ;FORMAT, COL/SPACE CHAR  ;
      ;        DESIRED CHAR,   ;
      ;        SPACE/COL CHAR. ;
      ;                        ;
      ;HL   POINT SCREEN LOC.  ;
      ;     CNTNTS IS ALTERED. ;
      ;DE   POINT FIRST CHAR.  ;
      ;     CNTNTS IS ALTERED. ;
      ;"FF" END CHR MARKER.    ;
      ;                        ;
      ;A    REG IS ALTERED.    ;
      ;CAUTION, NO ERROR TRAP. ;
      ;------------------------;

MPPKE LD A,(DE)      ;GET CHR.
      CP ENDM        ;QUIT IF IT
      RET Z          ; IS ENDM.
      LD (HL),COLSP  ;PRINT
      INC HL         ; COLSP.
      LD (HL),A      ;PRINT
      INC HL         ; CHARACTER.
      LD (HL),SPCOL  ;PRINT
      INC HL         ; SPCOL.
      INC DE         ;UPDT C PTR.
      JR MPPKE       ;GO GET NEXT
                     ; CHR.

      ;------------------------;
      ;         CP24L          ;
      ;------------------------;
      ; THIS ROUTINE WILL COPY;
      ;ALL 24 LINES OF THE     ;
      ;SCREEN TO THE TS2040    ;
      ;PRINTER.                ;
      ;------------------------;

CP24L LD D,LIN24 ;HOW MANY LIN?
      CALL COPY2 ;COPY THEM.
      RET

      ;--------- END ---------;
```

```
  5 REM ------------------------

        THIS PROGRAM WILL
DEMONSTRATE THE SPEED IN WHICH
MACHINE CODE PRINTS TO THE
SCREEN AS COMPARED TO BASIC.

  6 SLOW
 10 REM
        ------- TS1000 --------

                        MACHINE CODE

 20 RAND USR 16516
100 REM
        --- LINE NUMBERING ---

                                BASIC

110 POKE 16418,0
120 FOR A=0 TO 23
130 PRINT AT A,0;A
140 NEXT A
200 REM
        -------- PRESS -------

PRESS <C> FOR COPY OF PICTURE
          TO TS2040 PRINTER.

PRESS ANY OTHER KEY TO QUIT.

NOTE - INSERT LINE,
         30 GOTO 200
       INTO THE PROGRAM TO GET
       PICTURE OF JUST TS1000.

210 IF INKEY$="" THEN GOTO 210
220 IF INKEY$="C" THEN RAND USR
16723
```

```
4084  2A 0C 40 23 CD 95 40 CD
408C  9F 40 CD BF 40 CD E0 40
4094  C9 E5 0E 18 3E 80 CD B4
409C  40 E1 C9 E5 11 8C 01 19
40A4  0E 01 3E 88 CD B4 40 0E
40AC  01 3E 8A CD B4 40 E1 C9
40B4  06 20 77 23 10 FC 23 0D
40BC  20 F6 C9 E5 11 21 00 19
40C4  11 CC 40 CD 3B 41 E1 C9
40CC  80 B9 AE B2 AA BD 38 2E
40D4  33 28 31 26 2E 37 00 1D
40DC  1C 1C 1C FF E5 06 04 11
40E4  EF 01 19 11 00 41 CD 3B
40EC  41 13 CD 44 41 13 CD 3B
40F4  41 13 D5 11 22 00 19 D1
40FC  10 EC E1 C9 FF 1D 1E 1F
4104  20 21 22 23 24 25 1C FF
410C  80 80 FF 80 FF 36 3C 2A
4114  37 39 3E 3A 2E 34 35 FF
411C  80 FF 80 80 FF 26 38 29
4124  2B 2C 2D 2F 30 31 14 FF
412C  FF FF 18 3F 3D 28 3B 27
4134  33 32 1B 0C FF 80 FF 1A
413C  FE FF C8 77 23 13 18 F7
4144  1A FE FF C8 36 05 23 77
414C  23 36 85 23 13 18 F1 16
4154  18 CD 6B 08 C9
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HEX LIST OF TS1000 PICTURE

Bill Scolding meets biographer Rodney Dale, the 'warts and all' author of The Sinclair Story

Sinclair brought to book?

RODNEY DALE has known Sir Clive Sinclair for more than 20 years, ever since the Sinclair Radionics mail order operation was run from a disused bakehouse on Dale's premises in Cambridge.

Dale was involved with the development of the extraordinary and innovative Cambridge Consultants Ltd, which he later joined, forsaking his small publishing business. His path was to intersect with Sinclair's often in the years to follow. Later, when Dale became a fulltime freelance writer, he supervised the production of software manuals for Sinclair Research, most notably those for Logo.

The idea of writing the first biography of Sinclair came out of a discussion Dale had with Colin Haycraft, of Duckworth Publishers, in 1983.

"It emerged that Colin had been trying to get Clive's autobiography," Dale explains. "Clive had replied that he was too busy and in any case it would make him feel too old."

When Haycraft discovered that not only had Dale known Sinclair for some time, but would be interested in writing the biography, Sinclair was approached again.

"After much toing and froing Clive agreed that we could proceed. He wouldn't have consented," Dale adds, modestly, "to just anybody writing it."

Sinclair gave Dale several interview sessions and allowed him to rummage through his personal archive box. He granted, too, access to people in the company.

"'Granted' suggests that Clive had the right of veto over the manuscript," says Dale, "and I suppose in a way he did, though we agreed that he could later alter only errors of fact. He has seen the manuscript and hasn't exercised his right to change anything."

And how did Sinclair react to this 'warts and all' account? "Apparently he said, 'It's very accurate. I don't know where he got it all from.' "

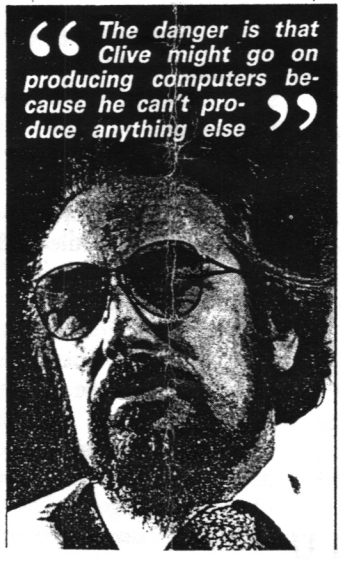
Apart from the archives, Dale got it all from 60 hours of interviews with associates and employees of Sinclair. That, and ransacking libraries for back issues of *Practical Wireless*, *Instrument Practice* and other relics of the past. Filing cabinets and cardboard boxes crammed with cuttings line the walls of Dale's office.

The result, *The Sinclair Story*, is about as comprehensive as you could wish. More important, it is very enjoyable to read. Photographs of the beardless Clive, pages from his school exercise books and charmingly ingenuous adverts for his earlier products — 'easily built in a single evening' — help recapture the excitement and naivety of Sinclair's growing pains and the immature computer industry.

It's all there — Sinclair's volatile friendship with Chris Curry, the tragic involvement with the bureaucratic National Enterprise Board, the abortive attempt to win the BBC contract, the arduous development of the ill-conceived C5. Running through it all is Sinclair's obsession with miniature television, on which research first started in 1964.

Omissions are few, though it is surprising that Dale glosses over the beginnings of Sinclair Research and the work which went into the ZX80, especially given his meticulous approach to the development of the pocket calculators and the MK14.

> "The danger is that Clive might go on producing computers because he can't produce anything else"



Dale is taken aback when this is pointed out to him. "Yes, there is quite a jump," he agrees, scribbling a note in the margin. "There's nothing sinister in that . . ."

Although *The Sinclair Story* claims only to be an account of Sinclair's business ventures, here and there we find the man behind the name peeping between the lines. Dale explains, "I asked Clive in an early interview how much he wanted it to be about the business and how much about him. He replied that he didn't want to suddenly appear as if from nowhere, but he did want to remain private. And that's what happened."

As to the future, Dale thinks that the home computer industry is likely to go the same way as the calculator boom of the seventies. "It's been a juggernaut. It's run away and crushed everything in its path.

"It's not an industry which attracts cautious people. Had it been so, perhaps the brakes could have been applied earlier rather than at the edge of the precipice."

Sinclair has been as guilty of that as anybody. "There are people within the company who individually think that caution and circumspection are a good thing, and that this has been overridden by success."

Drawing parallels with Sinclair's dogged determination to continue producing calculators long after the market had died, Dale adds, "The danger is that Clive might go on producing computers because he can't produce anything else."

Sinclair's venture into electric vehicles does not appear to be the answer, though Dale too was fired by Sinclair's enthusiasm over the C5. "One of the most extraordinary moments of my life was realising that there was something wrong at Alexandra Palace," he says, thinking back to that snowy day when the C5 was unveiled. "It suddenly flipped from a brilliant idea which was going to be a vast success to something which was very dangerous."

But, Dale concludes, "The world would be a poorer place without Clive Sinclairs around. They make enormous mistakes but they also make life richer."

*Rodney Dale is author of a disparate volume of work, including a biography of Louis Wain, **The Man Who Drew Cats**; the modern folklore collection, **The Tumour in the Whale**; and **The World of Jazz**. With Ian Williamson he has co-authored Basic Programming and **The Myth of the Micro**.*

His last appearance as assistant editor was in April 1963, but the year he had spent marrying UTP to the semiconductor industry was of great mutual benefit. As a journalist he could approach all the semiconductor manufacturers and was welcomed with open arms.

One of the facets of Sinclair's genius lay in his ability to reduce the size of his designs. Although he had a sound grounding in theory, he was also very practical. He knew that manufacturers were selecting components to meet their published specifications, which left them with 'rejects'. These 'rejects' would obviously meet *some* specification; the art was to determine what that specification was. Having done that, he could design circuits in which components would perform perfectly well. Thus did he move from publishing to marketing.

The first intimation that the world had of the existence of Sinclair Radionics Ltd was the half-page advertisement which appeared in the hobby magazines in November 1962. This was for the Sinclair Micro-amplifier, 'the smallest of its type in the world', which 'out-performs amplifiers twenty times as large'. There was a picture of the Micro-amplifier sitting on a halfcrown.

Sinclair set up his research, development and marketing organisation in his office at Gough Square. However, the address given in the advertisements for Sinclair Radionics Ltd was 69 Histon Road, Cambridge; here is some background. In 1958, I started a design and printing company called Polyhedron Services, and two years later had moved to 69 Histon Road and become involved in the development of Cambridge Consultants Ltd. CCL was founded in 1960 by Tim Eiloart, a Cambridge chemical engineer.

When CCL wanted to set up a workshop, I let them the disused bakehouse at 69 Histon Road. By this time, Tim Eiloart had met Clive Sinclair; Clive had just set up Sinclair Radionics and needed an organisation to receive his mail, assemble sets of components into kits, and despatch them. It wasn't quite the high-tech work which CCL had envisaged but no matter; as the Sinclair advertisements appeared CCL was ready with the servicing organisation.

The half page Micro-amplifier advertisement was repeated in December 1962; and in January was expanded to a full page. Not knowing what was going on, I was somewhat surprised when we were asked to print a second batch of 1000 data sheets. The idea of 'stack it high and sell it cheap' by mail order was one with which we at Cambridge Consultants and Polyhedron were unfamiliar. 'He's either going to become a millionaire or go broke' we muttered to one another as piles of mail mounted.

The next thing we knew at Polyhedron was a request for 1000 cards regretting that, owing to an unprecedented demand, there might be some delay in despatching your Sinclair Slimline. This radio, the dream on which the original Sinclair Micro-Kit Co had been built, was announced in February 1963.

Sales were going from strength to strength; ideas for products were coming thick and fast. The CCL workshop was burgeoning, and the upper floor of the bakehouse was becoming somewhat overcrowded.

● ***The Sinclair Story**, by Rodney Dale, is published by Duckworth and is available from all good bookshops. If you have difficulty in finding it, contact the publishers, Duckworth Ltd, The Old Piano Factory, 43 Gloucester Cresent, London NW1. Price £9.95 inc p&p. Visa and Access accepted.*

...part 2 next issue.

CLIVE MARLES Sinclair was born near Richmond in Surrey on 30 July 1940. His father and grandfather were both engineers.

Clive's brother Iain was born in 1943 and his sister Fiona in 1947. The Sinclair children remember a particularly idyllic childhood. Clive came into his own in the holidays, for he loved swimming and boating and at an early age designed a submarine which owed as much to grandfather George's naval interests and Jules Verne as to the availability of government surplus fuel tanks.

Clive found the comparative freedom of holidays a necessary antidote to school; a time when he could pursue his own ideas and teach himself what he really wanted to know. A sensitive child with ways of thought and speech beyond his years, little interest in sports other than aquatic, he sometimes found himself out of joint with his schoolfellows.

He preferred the company of adults, and there were few places other than with his family where he could feel intellectual companionship. To some, the Sinclairs seemed to be unconventional, a family who spoke directly, frankly, and often argumentatively to one another as a matter of course — because not only was it more fun that way, but also, as Clive now says: 'You get more out of people by disagreeing with them.'

Clive went to Box Grove Preparatory School; he recalls it with affection, and was very upset when it was eventually closed. When he was ten, the school reported that it could teach him no more maths, and he moved on to the secondary phase of his education.

At about this time, his father suffered a severe financial setback. With Sinclair tenacity, he started from scratch — still in machine tools — and fought his way back in a remarkably short time. However, fighting one's way back is not without its effects on one's family, and Clive went to a number of schools for his secondary education. Taking his O-levels at Highgate School in 1955, and S-levels — in physics, and pure and applied maths — at St George's College, Weybridge.

Mathematics — that perfect, concise language — had always interested him deeply, and he had barely become a teenager when he designed a calculating machine programmed by punch cards. Because he wanted to make the adding as simple as possible, he did it all with 0s and 1s. 'I thought that was a great idea. I was really amazed to discover that this was a known system; the binary system. That discovery disappointed me deeply; I thought I'd made my fortune . . . but I was very pleased with the idea.'

As a teenager, he also 'discovered' electronics. He had always been fascinated by things miniature, and he carried this interest into his electronic designs, seeking to produce ever more refined and elegant circuits, using smaller and smaller components. The state of his bedroom — a mass of wires — was a family joke, but from it came amplifiers and radios for his family and close friends, and an electrical communications system for their hideouts in the woods.

He worked hard at school, particularly on subjects he was keen on, reading and absorbing far beyond the required level. If he wanted to learn something, he did so very readily; he had — and still has — an incredible facility for assimilating information. The converse is true; at school he had little time for subjects which did not interest him. While still at school he wrote his first article for *Practical Wireless*; it was published; heady stuff.

As an antidote for working hard, Clive and his friends were wont to hold wild teenage parties. A friend of his from a strict Catholic family recalls that one Christmas Eve, after a few drinks, he said to Clive: ' "I'm off to church; I've got to go because I'm in the choir", so Clive said he'd come along with me, and we staggered into the choir stalls and Clive just joined in with his fine bass voice. Not bad for an atheist!'

When he left school just before his eighteenth birthday, there was no reason why he should not have gone to university — except that he didn't want to. He knew from experience that what he wanted to learn he could find out for himself.

C M Sinclair's Micro Kit Co was formalised in an exercise book dated 19 June 1958 — three weeks before the start of his A-levels. In this book we find a radio circuit, 'Model mark I' with a components list: 'cost/set 9:11d + coloured wire & solder/nuts & bolts + celluloid chassis (drilled) = 9/–'.

He had been delighted to find how cheap components were if bought in bulk, and that there were such things as call-off rates. He also realised that to sell big you had to look big, even if you weren't. Not for him ninepenny words and five-and-sixpenny lines; he would think in terms of half-page advertisements at the very least.

Half-page advertisements and components by the thousand . . . where was the money to come from? Why not write another article for *Practical Wireless*? The article was accepted, although it was not published until the following November — no instant cash there. But then he saw *Practical Wireless* advertising for an editorial assistant; he applied for the job and got it. He told his parents it was a holiday job. After a decent interval, he told them that *Practical Wireless* thought very highly of him and that there were tremendous prospects there — none of which was true.

But as it turned out there *were* tremendous prospects because the magazine was run by an incredibly tiny staff: editor, assistant editor, and editorial assistant — Clive. The editor had to retire through illness and the assistant editor stepped into his shoes. He soon collapsed under the strain, and there was Clive Sinclair, at the age of 18, running *Practical Wireless*. He says that it was not a difficult job; all he had to do was to take the material from the regular contributors, look through the articles which poured in from hopeful amateurs, select enough for a well-balanced magazine, and give them an editorial polish. The day a week that editing *PW* took gave him plenty of time for further reading and circuit design. *PW* readers could not always get his published designs to work, but a design that didn't work always resulted in a large postbag.

A job which occupies an active mind for a fraction of the time lacks satisfaction. The Silver Jubilee Radio Show opened at Earl's Court at the end of August 1958, and Sinclair was representing *PW*, on Stand 108, selling magazines and subscriptions, and still wondering how to launch his own business. Opposite, on Stand 126, was Bernard's Publishing.

Sinclair recalls: 'There I was on the *Practical Wireless* stand, when all of a sudden an immense figure loomed up. It was Bernard Babani; out of the corner of his mouth, best gangster fashion, he said; "See you at the coffee stall in ten minutes."' At the coffee stall, Babani offered Sinclair £700 a year to run his publishing company. 'Maybe,' was the murmered reply, 'but I expect a rise after a short time.'

At Bernard's, Clive Sinclair designed and sometimes built circuits, and Mr Singh did the drawings and prepared the artwork for printing the books. The secretary, Maggie, did everything else. Sinclair's mother had been dubious about her son leaving the security of a monthly magazine but Bernard Babani said to her: 'Mrs Sinclair, your son's name will be on all the books we publish.' Many a true word; 25 years later that storeroom which was Sinclair's office is stacked high with books about microcomputers — and you don't have to look hard for the name 'Sinclair' on the covers.

But his burning ambition was still to start his own business and in 1961 he had registered a company, Sinclair Radionics Ltd, on 25 July. He took his design for a miniature pocket transistor radio and spent some time seeking a backer for its production in kit form. He gave in his notice to Babani, only to find that his backer had developed cold feet.

He needed another job to earn some money — both to live and to finance the business he was determined to start. He had little difficulty in finding one; he joined United Trade Press — based at 9 Gough Square, just off Fleet Street — as technical editor of the journal *Instrument Practice*.

His name first appears in *Instrument Practice* as assistant editor in March 1962. He lost no time getting to work, and 'Transistor DC Chopper Amplifiers' appears in two parts in May and June, followed by 'Silicon Planar Transistors in Hearing Aid Design'.

ZX-81/TS1000 Program

```
   1 REM VECTOR CALCULATOR
   4 REM PROGRAM COPYRIGHT 1988
BY  BILL HARMER,OTTAWA
   5 LET VER=0.53


   7 LET DIRE=VAL "9538"
   8 LET SYS=VAL "8050"
   9 LET DISK=VAL "9500"
  10 GOTO VAL "8000"
 500 REM SHIFT STACK DOWN
 510 FOR X=1 TO 3
 515 LET V(X)=U(X)
 520 LET U(X)=R(X)
 530 NEXT X
 540 DIM R(3)
 598 GOTO VAL "1050"
 600 REM ARITHMETIC ROUTINES
 620 PRINT AT 17,0;B$;B$;B$;B$;B
$
 630 LET O$(1)="ADD VECTOR 1 AND
 2"
 635 LET O$(2)="SUBTRACT VECTOR
2 FROM 1"
 640 REM LET O$(3)="GO TO OTHER
ARITHMETIC OPTIONS"
 641 LET O$(3)="GO TO HELP"
 650 GOSUB VAL "9100"
 655 REM GOTO ((POS=1)*700+(POS=
2)*700+(POS=3)*900+(POS=4)*8100)
 656 GOTO ((POS=1)*700+(POS=2)*7
00+(POS=3)*9848+(POS=4)*8100)
 700 REM ADD/SUB
 720 FOR X=1 TO 3
 730 IF POS=1 THEN LET R(X)=V(X)
+U(X)
 735 IF POS=2 THEN LET R(X)=V(X)
-U(X)
 740 NEXT X
 750 GOTO VAL "1050"
 900 REM OTHER ARITH OPTIONS CHO
ICE
 998 GOTO VAL "1000"
1000 REM PROGRAM START
1010 DIM V(3)
1012 DIM U(3)
1014 DIM R(3)
1015 LET CF=1
1050 PRINT "          CALCULATOR D
ISPLAY          "
1055 PRINT AT 3,0;"VECTOR 1=";V(
1);G$
1056 LET FG=NOT PI
1060 PRINT "VECTOR 1=";V(2);G$
1070 PRINT "VECTOR 1=";V(3);G$
1080 PRINT ,,"VECTOR 2=";U(1);G$
1090 PRINT "VECTOR 2=";U(2);G$
1095 PRINT "VECTOR 2=";U(3);G$
1100 PRINT ,,"ANSWER=";R(1);G$
1120 PRINT "ANSWER=";R(2);G$
1130 PRINT "ANSWER=";R(3);G$
1200 LET O$(1)="ENTER VALUES FOR
 A VECTOR"
1210 LET O$(2)="CALCULATE NEW VE
CTOR ANSWER"
1220 LET O$(3)="SHIFT STACK DOWN
"
1230 LET O$(4)="RETURN TO MENU"
1240 GOSUB VAL "9100"
1250 GOTO ((POS=1)*2000+(POS=2)*
600+(POS=3)*500+(POS=4)*8100)
1999 STOP
2000 REM INPUT ROUTINE
2010 LET CF=1
2020 GOSUB VAL "9400"
2050 LET O$(1)="ENTER NEW VALUES
 FOR VECTOR 1"
2060 LET O$(2)="ENTER NEW VALUES
 FOR VECTOR 2"
2070 LET O$(3)="RETURN TO PREVIO
S CHOICES"
2080 GOSUB VAL "9100"
2090 GOTO ((POS=1)*2100+(POS=2)*
2200+(POS=3)*1050+(POS=4)*8100)
2100 REM INPUT VECTOR 1
2110 PRINT AT 17,0;B$;B$;B$;B$;B
$
2120 FOR X=1 TO 3
2130 PRINT AT 17,0;"ENTER ELEMEN
T ";X;" VECTOR 1";G$
2140 INPUT V(X)
2150 PRINT AT 16,0;"ELEMENT ";X;
"=";V(X);G$
2160 NEXT X
2180 GOTO VAL "1050"
2200 REM INPUT VECTOR 2
2210 PRINT AT 17,0;B$;B$;B$;B$;B
$
2220 FOR X=1 TO 3
2230 PRINT AT 17,0;"ENTER ELEMEN
T ";X;" VECTOR 2";G$
2240 INPUT U(X)
2250 PRINT AT 18,0;"ELEMENT ";X;
"=";U(X);G$
2260 NEXT X
2280 GOTO VAL "1050"
2299 STOP
2390 GOTO VAL "1050"
6010 GOSUB VAL "9600"
6050 LET O$(1)="FIRST OPTION"
6055 LET O$(2)="SECOND"
6060 LET O$(3)="THIRD"
6065 LET O$(4)="FOURTH"
6070 GOSUB VAL "9100"
6080 GOTO ((POS=1)*6100+(POS=2)*
6200+(POS=3)*6300+(POS=4)*6400)
6090 STOP
6100 PRINT 1
6110 STOP
6200 PRINT 2
6210 STOP
6300 PRINT 3
6310 STOP
6400 PRINT 4
6410 STOP
6990 GOSUB VAL "9300"
6995 GOTO VAL "8400"
6999 STOP
8000 REM BEGINNING
8007 REM VARIABLES USED D$---,B$
(BLANK),T$(TITLE),  A$(ANSWER),X
,N,LOOP VARIABLES
8008 REM CF IS CLS IN CALIF IF 0
8009 LET CF=0
8010 DIM O$(4,31)
8011 LET FG=0
8012 LET B$="
                "
8015 LET D$="-------------------
---------------"
8016 LET G$="                "
8020 REM 9300 PRESS ANY KEY TO
GO ON,9000 CASSETTE SAVE,9500
DISK SAVE
8025 REM 9850 PROGRAM INFO,9600
INITIAL GRAPHICS
8030 REM DEFINE TITLE HERE AS T$
8035 LET T$="3-D VECTOR CALCULAT
OR"
8040 GOSUB VAL "9600"
8049 GOTO VAL "8053"
8050 CLS
8051 PRINT ,,"ENTER SYS COMMAND"
8052 INPUT A$
8053 CLS
8055 IF A$="E" THEN GOTO VAL "10
00"
8061 IF A$="Q" OR A$="MEM" THEN
GOTO VAL "8400"
8062 IF A$="DIRE" THEN GOTO VAL
"9538"
8063 IF A$="DISK" THEN GOTO VAL
"9500"
```

```
8064 IF A$="SAVE" THEN GOTO VAL "9000"
8065 IF A$="SKIP" OR A$="S" THEN GOTO VAL "8100"
8066 REM GO TO INTRO INFO
8070 GOSUB VAL "9850"
8085 REM GO TO TITLE PRINT
8100 CLS
8101 LET M$=""
8102 GOSUB VAL "9800"
8103 LET CF=0
8105 PRINT "                    MENU",,
8120 PRINT "1-MAIN PROGRAM START"
8125 PRINT
8130 PRINT "2-GOTO INFO ON PROGRAM"
8135 PRINT
8140 PRINT "3-QUIT PROGRAM"
8145 PRINT
8150 PRINT "4-MAKE CASSETTE COPY OF PROGRAM"
8200 GOSUB VAL "8900"
8310 IF M$="1" THEN GOTO VAL "1000"
8320 IF M$="2" THEN GOTO VAL "9850"
8330 IF M$="3" THEN GOTO VAL "8400"
8340 IF M$="4" THEN GOTO VAL "9000"
8370 GOTO VAL "8100"
8400 CLS
8420 PRINT "**PROGRAM--";T$;"--ENDED**"
8440 PRINT ,,"MEMORY USED=";PEEK 16404+256*PEEK 16405-16384;" BYTES INCL. SYS VARIABLES"
8450 PRINT ,,"THATS ALL FOLKS"
8460 PRINT ,,"ENTER ""GOTO 1"" TO RESTART"
8899 STOP
8900 PRINT AT 21,0;"PRESS NUMBER OF YOUR CHOICE"
8910 LET M$=INKEY$
8930 IF M$="" THEN GOTO VAL "8910"
8940 CLS
8945 RETURN
8999 STOP
9000 REM CASSETTE SAVE
9010 CLS
9020 PRINT ,,,,"CASSETTE SAVE BEGINNING"
9030 PAUSE 200
9035 CLS
9036 CLEAR
9040 SAVE "VCAL█"

9050 GOTO SGN PI
9100 REM CALIF S.
9130 PRINT AT 17,0;"MOVE > TO CHOICE AND PRESS ENTER"
9140 PRINT "█";O$(1)
9150 PRINT "█";O$(2)
9160 PRINT "█";O$(3)
9170 PRINT "█";O$(4)
9175 LET POS=1
9180 LET PRPOS=1
9190 LET C$=""
9200 LET C$=INKEY$
9210 IF CODE C$=118 THEN GOTO 9285
9215 IF C$<>"7" AND C$<>"6" AND CODE C$<>112 AND CODE C$<>113 THEN GOTO 9190
9217 LET PRPOS=POS
9220 IF C$="7" OR CODE C$=112 THEN GOTO 9250
9230 IF POS>=1 AND POS<=3 THEN LET POS=POS+1
9240 GOTO 9260
9250 IF POS>=2 AND POS<=4 THEN LET POS=POS-1
9260 PRINT AT 17+POS,0;"█"
9270 IF PRPOS<>POS THEN PRINT AT 17+PRPOS,0;"█"
9275 GOTO 9190
9285 IF CF=0 THEN CLS
9290 RETURN
9295 REM OPTIONAL CLS NEXT
9300 PRINT AT 21,0;"PRESS ANY LETTER KEY TO GO ON"
9310 IF INKEY$="" THEN GOTO 9310
9320 CLS
9339 RETURN
9400 REM TRANSITION BLOCK BETW TWO CALIF ROUTINES
9410 PRINT AT 17,0;"-----PRESS ENTER TO GO ON            ";B$;B$;B$;B$
9420 INPUT A$
9449 RETURN
9500 REM DISK SAVE
9505 CLS
9510 PRINT USR 14336
9520 REM SAVE"VCAL0.B5"
9530 SLOW
9535 PRINT "VERIFY? (Y OR N)"
9536 IF INKEY$<>"Y" AND INKEY$<>"" THEN GOTO 9540
9537 IF INKEY$="" THEN GOTO 9536
9538 PRINT USR 14336
9539 REM DIRE
9540 CLS
9550 GOTO SGN PI
9600 REM INITIAL DISPLAY
9630 PRINT AT 7,0;"█...";AT 11,0;"█...";AT 8,0;"█";AT 10,0;"█";AT 8,31;"█";AT 10,31;"█"
9640 REM PRINT AT 7,0;D$;AT 11,0;D$
9660 PRINT AT 9,0;"█";AT 9,(INT ((32-LEN T$)/2));T$;AT 9,31;"█"
9665 PRINT AT 14,11;"VER.";VER
9670 PRINT AT 17,3;"PROGRAM COPYRIGHT 1988 BY          BILL HARMER,OTTAWA"
9700 PRINT AT 21,0;"PRESS ""ENTER"" TO GO ON"
9710 INPUT A$
9780 RETURN
9800 REM TITLE PRINT S.
9805 FOR N=1 TO INT ((32-LEN T$)/2)
9807 PRINT " ";
9808 NEXT N
9810 PRINT T$
9815 PRINT
9820 RETURN
9848 CLS
9849 LET FG=SGN PI
9850 REM PRELIMINARY INFO HERE
9852 GOSUB VAL "9800"
9855 PRINT "           PROGRAM INFO",,
9860 PRINT "THIS IS A VECTOR CALCULATOR      PROGRAM"
9870 PRINT ,,"IT WILL ACT LIKE A SCREEN CAL-  CULATOR FOR THREE DIMENSIONAL   VECTORS,THAT IS 3-TUPLES"
9880 PRINT ,,"MOVE INVERTED > (█) CURSOR UP    OR DOWN WITH ARROW KEYS UNTIL ITIS OPPOSITE THE OPTION YOU WANT AND THEN PRESS ENTER"
9960 GOSUB VAL "9300"
9989 IF FG=1 THEN GOTO VAL "1050"
9990 RETURN
```

SUPERCOMPUTER

SFU Buys Its First Mini-Supercomputer!

SFU has purchased its first mini-supercomputer. The computer, manufactured by Silicon Graphics Corporation and valued at more than $300,000, will be used exclusively for research purposes. It should be operational in early July.

The mini-supercomputer's strength lies in its ability to process very large computations at great speed. The unit is able to perform at a speed of 32 MEGAFLOPS (million floating point operations per second).

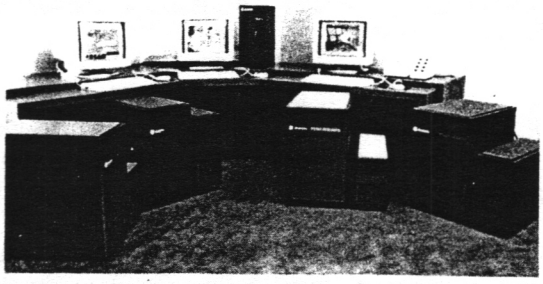
The purchase follows a two-year study into the university's large scale computing needs and comes at a time when the existing mainframe computer, an IBM 3081, is at full capacity. The 3081 does both general purpose and research computing.

The mini-supercomputer's particular capabilities mean that researchers dealing with huge computational problems will benefit from considerably faster turn-around times. We estimate that a group of jobs which now take 24 hours on the mainframe will take only three hours on the mini-supercomputer.

The new installation is a first step in the establishment of a comprehensive large-scale computing facility at SFU. Over time, we expect a number of special purpose mini-supercomputers will be installed on campus.

A recent study showed there was no immediate need for a full-blown supercomputer at SFU. Similar capabilities can be provided by purchasing mini-supercomputers that are more tightly focussed, less costly and more economical to maintain. In fact, we'll get the same processing capacity for our specific workload as can be provided by an expensive supercomputer system like the one at the Ontario Supercomputing Centre.

Full-scale supercomputers can cost many millions of dollars to purchase and typically require hundreds of thousands of dollars to support and maintain each year.



The Silicon Graphics mini-supercomputer system features eight processors in two small containers, each container measuring 26 by 26 by 27 inches and weighting 185 pounds. It can be plugged into a standard wall outlet and requires no special environment.

Dr. David Boal, a theoretical physicist who will be a major user of the new facility, describes the purchase as a "real step forward" for research at SFU. "This computer will increase by a factor of 10 the work that we can do. The existing system is completely overloaded. I've got graduate students, for example, who can't graduate because they can't get enough computing time to complete their research."

Use of the mini-supercomputer will be restricted to appropriate projects. Initial users include physicists and chemists working on a number of research initiatives. These include investigations as to why blood cells change their shapes in response to differences in temperature or salinity. Other projects include computer-based animation projects and computer simulations to predict the electrical properties of very thin films and wires.

"These are horrible problems in terms of their complexity," explained Dr. Boal. "We can fill this new computer up for months on these problems alone."

The new large-scale computing facility will be part of SFU's overall network of distributed computing in which hundreds of specialized computers are linked by a high-speed communications network.

Teacher loses job in piracy controversy

by Yves Leclerc

Special to Computing Canada

SAQUENAY LAC ST. JEAN, Que. – A bizarre case involving a suspended computer teacher and alleged software piracy has residents buzzing in this community north of Quebec City.

Yolande Blackburn-Fortin, an instructor at the local high school, lost her job last month for refusing to teach classes and "inciting students to disobey" policies set down by the area's school board.

The incident began in 1987 when the board, anxious to permit teachers to begin using the school's Macintosh-equipped computer laboratory, decided to systematically copy certain commercial software packages, while waiting for a hard disk network to be installed or a multi-copy licence to be obtained.

Since the measures were meant to be temporary, the computer teachers agreed.

However, a year went by and the situation still hadn't changed. In fact, a written "temporary authorization to copy software" was circulated by the school principal, Claude Gagnon, naming Apple's system software and the programs "MacPaint", "MacWrite" and "MacDraw".

The "temporary" measures were extended to the full school year, even though Fortin had emphasized the illegal nature of the practice in a letter addressed to the director in August 1988. In it, she underlined the damaging effects on the students.

According to the letter (translated from its original French) "When a teacher's first gesture is to show students how to copy a diskette, without being able to inform them that the school has a licence to do so, it's not surprising to find illegal copies everywhere, or even to see a profitable little commerce being carried on by some students.

"I trust you fully appreciate the urgency of regularizing this situation, one which could have serious consequences for our school board involving copyright violation."

At the beginning of the current year, no new measures had been taken. The situation was further confused by the fact that the school board had decided to equip the school with IBM PCs instead of Macintoshes.

There were no funds available to correct the situation in the Macintosh laboratory, which meant that teachers wishing to continue using it, would have to do so with the existing hardware and software.

At that point, Fortin refused to teach her classes and informed her students of the reasons why.

On Oct. 5, the school suspended her without pay, a decision that was confirmed by the school board eight days later.

Parent refused access

During the same week, a local radio station reported the dismissal, and was immediately cited for libel by the school board's lawyer.

After the story broke, a concerned parent decided to visit the laboratory herself, was refused access by the school principal, and promptly took her child out of the school.

While the chairman of the school board, Denis Gosselin, did order an investigation into the issue of piracy, he also made some surprising and revealing declarations to the local media – some of them making front-page headlines.

"Even if there was piracy, what company would dare take a school board to court and risk having their products boycotted in the school market," he said.

He also said that copying could hardly be considered a crime and if it was, "practically every computer owner in town, at one time or another, is a criminal."

Finally, on Oct. 17, the RCMP visited the school and seized the computers, as part of an "an investigation to determine whether or not piracy is being practised in the institution."

School board trustees have refused, however, to take a stand on the piracy issue until an internal investigation has been completed into not only the school's practices in Jonquiere but also all 42 institutions under their jurisdiction.

The fate of Fortin is not as clear. At press time, she remained under suspension and was not teaching.

LiNe TrAcE

TAKE THE PAIN out of de-bugging ZX-81 programs with **Line Trace** by Barry Nicholson of Tyne and Wear. The program is a short machine-code routine which uses interrupts to constantly monitor the operation of a Basic program.

First, enter POKE 16389,127 to lower RAMTOP. The LOAD the program and RUN it. The code will be POKEd in and the program will then NEW. Now you can write your Basic program. Typing RAND USR 32512 will activate the routine, and when your program is RUN the line numbers will be printed at the bottom of the screen as they are executed. RAND USR 32517 turns the routine off.

The routine will happily deal with any Basic program unless it uses the commands FAST or PAUSE.

```
  10 REM ZX81 TRACE  1984
  20 SLOW
  30 PRINT TAB 3;"NOW LOADING AB
OVE RAMTOP",,,"ZX81 TRACE","BY B
.NICHOLSON",,,"COMMANDS:-",,,,"T
RACE ON ,, RAND USR 32512","TRAC
E OFF.. RAND USR 32517",,,"WHEN
SCREEN CLEARS,LOAD IN YOUR BASIC
 PROGRAM."
  35 REM 1
  40 LET A$="DD216A7FC9DD218102C
9E80364000A0001002A34402B3E7FA4B
57C20031718024637672234400"
  45 REM 2
  50 LET A$=A$+"CDBB02ED4B254022
254078C602ED423A2740B4B558060B21
3B40CB862008CB7ECBC6C8"
  55 REM 3
  60 LET A$=A$+"0500372127403FCB
1010FE467BFEFE9F061FB6A01F77D3FF
2A0C40CBFCCD7B7FED5F010119"
  65 REM 4
  70 LET A$=A$+"3EF5CDB5022BCD7B
7FC3127FDDE1FD4E28FDCB3B7E200C3E
FC0601CDB5022BE3E3DDE9"
  75 REM 5
  80 LET A$=A$+"79ED443C08D3FEDD
E53A0840CB7F2807DDE1E1D1C1F1C9DD
3A0C4011D702DD192A0740110A7F"
  85 REM 6
  90 LET A$=A$+"1A4F131A47AFB7ED
42380333C18F909C61CDD7700DD2379FE
012803131BE20E0206DC10FE0D28C318
F7"
 100 REM  (PRINT LEN A$)
      SHOULD GIVE:- 450
 105 REM ******
 110 LET B=32512
 120 FOR K=1 TO LEN A$ STEP 2
 130 POKE B,16*(CODE A$(K)-28)+C
ODE A$(K+1)-28
 140 LET B=B+1
 150 NEXT K
 160 NEW
 170 SAVE "TRACE"
 180 LET RT=32512
 190 IF (PEEK 16388+256*PEEK 163
89)=RT THEN RUN
 200 PRINT "RAMTOP NOT LOWERED T
O ";RT,,,"PLEASE LOWER RAMTOP BY
:-",,,"  POKE 16389,127....NEWLI
NE",,,"FOLLOWED BY: NEW....NEWLI
NE",,,"THEN RELOAD ""TRACE"""
```

GOSSAMER creates beautiful patterns for the QL using sets of straight lines to create spirals and helixes. For more complex patterns increase the value of j in line 50. For asymmetrical patterns delete line 170 from the listing.

Gossamer was written by Arthur Douglass from London.

Gossamer

```
10 MODE 8
100 WINDOW 512,256,0,0:PAPER 0:C
LS:BORDER 16,0
110 OPEN#3,CON_512x256a0x0:PAPER
#3,0:CLS#3:BORDER#3,16,0
120 a=RND(1 TO 140):b=RND(1 TO 1
00):c=RND(3):d=RND(3):IF NOT c A
ND NOT d:GO TO 120
130 e=RND(1 TO 140):f=RND(1 TO 1
00):g=RND(3):h=RND(3):IF NOT g A
ND NOT h:GO TO 130
140 INK_CHANGE
150 FOR j=1 TO 300
160 LINE a,b TO e,f
170 LINE#3,(148-a),b TO (148-e),
f:       REMark Remove this Line
 for a non              symmetrical
 pattern.
180 a=a+c:b=b+d:e=e+g:f=f+h
190 IF a>148 OR a<1:c=c*-1:INK_C
HANGE
200 IF b>100 OR b<1:d=d*-1:INK_C
HANGE
210 IF e>148 OR e<1:g=g*-1:INK_C
HANGE
220 IF f>100 OR f<1:h=h*-1:INK_C
HANGE
230 END FOR j
240 BEEP 10000,76:PAUSE 200:RUN
250 DEFine PROCedure INK_CHANGE
260 i=RND(1 TO 6)
270 INK i:INK#3,i
280 END DEFine
```

DOMINOES

PLAY DOMINOES in a full machine-code version which, amazingly, runs on the expanded ZX-81. Written by David Gist of Hastings, Sussex, the game is for two players. Instead of dots, the dominoes use symbols from the keyboard. After five dominoes have been played, a new game starts, and the winner is the player with the fewest penalty points at the end.

Penalty points are accrued if you try to play an illegal domino. Unfortunately you are not allowed to see your own hand, but instead have a list of which symbols remain and how many. It is up to you to remember what has been played and work out what is left from the list.

To enter the game, first type in Listing One, making sure there are at least 450 characters in the REM statement. Then run the program, and type in the number in Listing Two as you are prompted. You will be asked to input five numbers and then a checksum. The checksum is indicated in the listing by an asterisk, but you should not enter the asterisk, just the number.

When the code has been successfully entered you should delete lines 10 to 140 and substitute a line 100 RAND USR 16567. Save a copy of the program before you try it out, or you may lose the lot if there is still a mistake.

Listing 1

```
    1 REM XXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXX
   10 LET X=16514
   20 IF X=16965 THEN STOP
   25 LET K=0
   30 FOR N=1 TO 5
   40 PRINT AT 0,0;"ENTER NUMBER"

   50 INPUT A
   60 PRINT A;"    "
   70 POKE X,A
   75 LET K=K+A
   80 LET X=X+1
   90 NEXT N
  100 PRINT AT 0,0;"ENTER CHECK";
  110 INPUT A
  115 PRINT A
  120 IF K=A THEN GOTO 20
  130 PRINT "ERROR IN CHECKSUM"
  140 STOP
```

Listing 2

118	118	24	25	26	*311
28	29	32	33	34	*156
35	36	37	39	42	*189
44	46	209	26	19	*344
213	254	255	200	215	*1137
24	246	245	229	203	*947
71	40	5	33	113	*262
66	24	3	33	96	*222
66	126	254	165	32	*643
3	54	156	43	52	*308
225	241	201	205	147	*1019
64	0	0	128	49	*241
42	43	57	0	156	*298
156	128	41	52	50	*427
46	51	52	56	128	*333
55	46	44	45	57	*247
0	156	156	128	255	*695
245	1	0	1	205	*452
245	8	6	9	14	*282
30	175	215	13	32	*465
252	62	118	215	16	*663
244	241	60	32	43	*620
205	147	64	0	0	*416
128	13	8	34	128	*311
128	21	8	34	128	*319
128	12	8	34	128	*310
128	16	8	34	128	*314
128	23	8	34	128	*321
128	255	33	132	64	*612
17	93	64	14	16	*204
237	176	88	5	33	*539
161	64	126	238	8	*597
119	33	68	65	126	*411
238	8	119	4	32	*401
9	62	5	6	40	*122
33	0	32	24	6	*95
193	225	241	205	157	*1021
64	245	229	197	83	*818
30	2	203	71	32	*338
7	33	185	66	54	*345
177	24	5	33	66	*305
67	54	183	35	54	*393
157	213	229	205	187	*991
2	44	32	250	205	*533
187	2	37	68	77	*371
44	40	247	205	189	*725
7	126	33	142	67	*375
1	21	0	237	177	*436
225	209	32	14	29	*509
40	16	74	87	52	*269
121	186	40	213	167	*727
40	210	87	54	0	*391
90	24	147	54	0	*315
95	130	33	93	64	*415
14	15	237	177	32	*475
240	43	117	122	193	*715
225	213	229	22	2	*691
213	23	23	23	111	*393
38	30	22	8	62	*160
155	50	48	64	197	*514
213	22	8	94	203	*540
123	32	9	213	197	*574
229	205	178	11	225	*848
193	209	203	3	12	*620
21	32	237	35	209	*534
193	5	21	32	225	*476
209	21	40	4	193	*467
123	24	203	209	123	*682
6	2	197	33	142	*380
67	1	23	0	237	*328
177	193	35	53	187	*645
32	7	126	254	28	*447
32	2	24	61	122	*241
16	231	241	205	157	*850
64	254	5	32	6	*361
1	9	32	33	17	*92
32	254	4	32	6	*328
1	26	32	33	26	*118
40	254	3	32	6	*335
1	35	40	33	43	*152
40	254	2	32	6	*334
1	52	40	33	52	*178
32	61	194	60	65	*412
6	255	11	120	177	*569
32	251	195	215	64	*757
241	205	157	64	1	*668
10	5	205	245	8	*473
205	147	64	44	38	*498
50	42	0	52	59	*203
42	55	255	201	118	*671

WHAT THE '90s HAVE IN STORE

By the year 2000, personal computers will have access to 100,000 times more data than today, thanks to networking and optical storage. Such "knowledge technologies" will come to the forefront as computing shifts from being process-centered to being knowledge-centered. So says George H. Heilmeier, senior vice president and chief technical officer of Texas Instruments Inc. Heilmeier also points to developments in six critical areas:

•Telecommunications: Intelligent networks will have knowledge-based network management. Local-area wireless communications will penetrate the low-speed LAN market leading to the wireless office and home.

•Automobiles: About $2,000 will be spent per car for electronics by 1995 (see p. 78). Autos will become mobile offices linked by fax and phone to home-office LANs.

•Manufacturing: The factory floor will be more customized, with shorter start-up times and production runs. Factories will have artificial-intelligence-based command, control, and communications systems. Brilliant systems will merge and interpret information from multiple sensors and manage their own operations by planning and acting.

•Consumer: High-definition TV will become a major market for analog-to-digital converters, video processors, memories. If the Far East doesn't dominate the U. S. market, work station and computer companies—rather than consumer—will be major players. To succeed in mass markets, system entry prices must be less than $2,000. Large displays, probably projection-type, will be imperative.

•Microelectronics: Chip-level performance will double, with the same design rules as today, based on biCMOS; at the system level, performance will double. Packaging density will be 50 times higher than that of surface mounting while manufacturing will be under 0.5-μm. Full-custom, million-transistor designs will take three months with three to five designers. Design automation will produce not only first-pass functionality but also first-pass parametrics, quality, reliability, manufacturability, and testability. Silicon and gallium arsenide functions will be married on the same chip.

•Knowledge technologies: PCs will go from handling the pencil-and-paper tasks of the modern office to a knowledge-access tool. Adaptive access to information will be a major issue. The ability to browse, manipulate, and retrieve will be simplified; trial solutions or a consulting function will be available. Knowledge systems will progress from smart to brilliant, capable of managing their own missions. This will be accomplished in real time. Hypermedia—multimedia presentation of information—based on object-oriented programming and data bases—will be the spreadsheet of the '90s. *–S. W.*

Electronics / October 1989

THE SOUND OF MUSIC

INCREASE the sensitivity of your eardrums and set the hills alive with a musical game for the QL by Frederic Huynh of Paris in France.

The Sound of Music plays a tune of eight notes and asks you to duplicate if from memory. At the end of the game you will be given a score based on the number of notes correct, and the computer will play both versions for comparison.

QL users may also find the numerical values for a scale useful, as the QL manual does not provide any information on the subject itself.

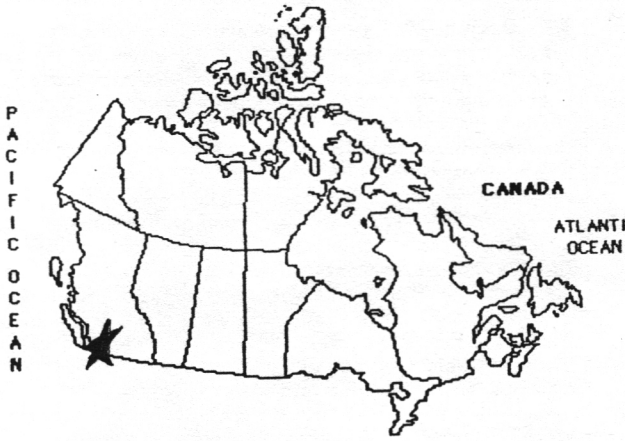
```
100 REMark DOREMI v.2-1
110 MODE 8
120 OPEN #4,scr_:WINDOW #4,442,2
00,38,16
130 PAPER #1,0:PAPER #2,0:CLS:CL
S #0
140       start
150 RESTORE :CLS
160       initialisation
170 CSIZE #0,3,1
180       octave
190 PAUSE 100:      ecoute
200 PAUSE 100:CLS# 0:      hasard
210       entree
220       CLS #0:compare
230       fin
240 IF ans=1 THEN PAUSE 10:PAUSE
 10:PAUSE 10:RUN
250 END IF
260 PAUSE 5:PAUSE 5:CSIZE #0,2,0
:CLS:CLS#0:STOP
20000 DEFine PROCedure initialis
ation
20010 RANDOMISE
20020 DIM a(9):DIM b(9):DIM resu
lta(9):DIM h(9):r=1:bon=0
20030 col=-30
20040 FOR i=1 TO 8
20050 READ a(i),b(i)
20060 END FOR i
20070 DATA 33,90,28,80,24,70,22,
60,18,50,15,40,12,30,11,20
20080 RETurn
20090 DEFine PROCedure octave
20100 AT #0,1,2:PRINT #0;"  List
en to the scale"
20110 x=20
20120 FOR i=1 TO 8
20130 BLOCK 30,b(i),x,100-b(i),i
:x=x+50
20140 BEEP 10000,a(i):PAUSE 20
20150 END FOR i
20160 RETurn
20170 DEFine PROCedure ecoute
20180 AT #0,1,4:PRINT #0;"    One
 more time      "
20190 FOR i=1 TO 8
20200 BEEP 10000,a(i):PAUSE 20
20210 END FOR i
20220 RETurn
20230 DEFine PROCedure hasard
20240 AT#0,1,4:PRINT #0;" Now ,
Listen to the score"
20250 FOR i=1 TO 8
20260 h(i)=INT(RND(1 TO 8))
20270 BEEP 10000,a(h(i)):FOR z=1
 TO 200:NEXT z
20280 END FOR i
20290 PAUSE 100:AT #0,1,0:PRINT
#0;"         Last audition !      "
20300 FOR i=1 TO 8
20310 BEEP 10000,a(h(i)):FOR z=1
 TO 200:NEXT z
20320 END FOR i
20330 RETurn
20340 DEFine PROCedure entree
20350 INK #0,3:AT #0,1,0:PRINT #
0;"    Enter your solution ":INK
 #0,7
20360 y=20
20370 BLOCK 30,5,y,100,2
20380 IF KEYROW(1)=16 AND y<370
THEN y=y+50:BLOCK 30,5,y-50,100,
0:BLOCK 30,5,y,100,2
20390 IF KEYROW(1)=2 AND y>20 TH
```

THIS IS really silly. You've only yourself to blame if you type it in. We loved it, anyway.

There's not much more to say about **Harmonic Horror**, except, in the immortal words of the author James Beauchamp from Allestree, Derbyshire, Ole!

Oh yes, it runs on any Spectrum.

```
  5 GO TO 50
 10 DATA 19,16,18,15,19,-12,16,
12,15,11,16,-5,12,7,11,7,12,-12,
7,4,7,4,7,-5,4,0,5,2
 15 DATA 7,-12,9,5,11,2,12,4,14
,-5,16,7,17,-10,14,9,14,7,14,-5
 20 DATA 17,14,16,13,17,-10,14,
11,13,10,14,-5,11,7,10,6,11,-10,
7,2,7,-1,7,-5,19,11,18,10
 25 DATA 19,-10,21,17,19,16,17,
-5,16,11,14,5,12,-12,12,-8,12,-5
,12,0
 30 DATA 14,9,14,7,-6,14,9,6,9,
4,-10,9,12,4,12,6,-5,12,11,7,11,
-10,11,-5
 35 DATA 14,11,14,7,14,-6,9,6,9
,4,9,-10,12,6,9,2,11,-5,9,2,7,2,
7,-1
 40 DATA 14,9,14,7,14,-6,9,6,9,
4,9,-10,12,6,14,6,12,-5,11,7,11,
-10,11,-13
 45 DATA 14,9,14,7,14,-12,16,7,
14,7,12,-6,11,7,9,0,7,-5,7,-1,7,
2,7,5
 50 PRINT AT 10,3;"     PRESS AN
Y KEY TO PLAY"
 55 PAUSE 0
 60 INK INT (RND*6)+1: FLASH 1:
 CLS
 65 PRINT AT 10,8; BRIGHT 1; IN
K 0;"!!! OLEY !!!"
 70 LET co=96: LET p1=0
 90 FOR n=1 TO co
100 READ a,b
105 FOR c=1 TO 3
110 BEEP .02,a: BEEP .02,b
115 NEXT c
120 NEXT n
125 LET p1=p1+1
130 IF p1=2 THEN  FLASH 0: INK
0: RUN
140 RESTORE : LET co=48: GO TO
90
```



VSUG

The Vancouver Sinclair Users Group has been in existence since 1982. We are a support group for the owners and users of all SINCLAIR and TIMEX computers.

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